

## Executive Summary

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Fairfax County's Stream Protection Strategy Baseline Study report documented conditions in the county's streams based on biological communities observed at 114 targeted monitoring sites. The abundance and diversity of fish and benthic macroinvertebrates (aquatic bugs) provides an indicator of the overall health of streams and a way to evaluate the effectiveness of measures to protect and restore this natural resource. The results of the baseline study suggested that three-quarters of the county's streams were in "fair" to "very poor" condition and that approximately 70 percent of streams needed some degree of restoration.

The baseline study set the foundation for implementing a watershed management program to protect and restore streams, the riparian corridors (stream valleys) and associated resources such as the county's drinking water supply and to help reverse impaired conditions of the Chesapeake Bay. Currently, watershed plans have been initiated or completed for approximately 50 percent (200 square miles) of the county. The development of watershed management plans are scheduled for completion by 2009.

In 2004 the county's biological sampling strategy was re-evaluated and long-term goals established. It was determined that annual countywide conditions and trends were best determined from a probability-based sampling procedure, rather than the targeted sampling approach employed in the baseline study. Various volunteer biological monitoring activities were identified as valuable data sources for site-specific trend evaluations. In addition, the bacteria monitoring program previously administered by the Health Department for over 30 years was integrated into the biological monitoring program to provide a more comprehensive report on water quality from both a biological and human health perspective.

This annual report documents the results from a probability-based sampling procedure conducted in 2004. It includes several new items that were not part of the original baseline study including:

- the findings of volunteer monitors that routinely monitor streams through the Northern Virginia Soil and Water Conservation District and Audubon Naturalist Society volunteer monitoring programs,
- the results and analysis of the bacteria monitoring that was formally conducted by the Health Department,
- a Fish Index of Biotic Integrity, a multimetric index for fish community analysis,
- a countywide stream quality index that will be calculated annually to report the overall condition of streams, and to help determine the progress of future restoration efforts.

The biological monitoring program is intended to serve many needs including requirements under the Virginia Pollution Discharge Elimination System (VPDES) or Municipal Separate Storm Sewer System (MS4) stormwater permit issued by the state.

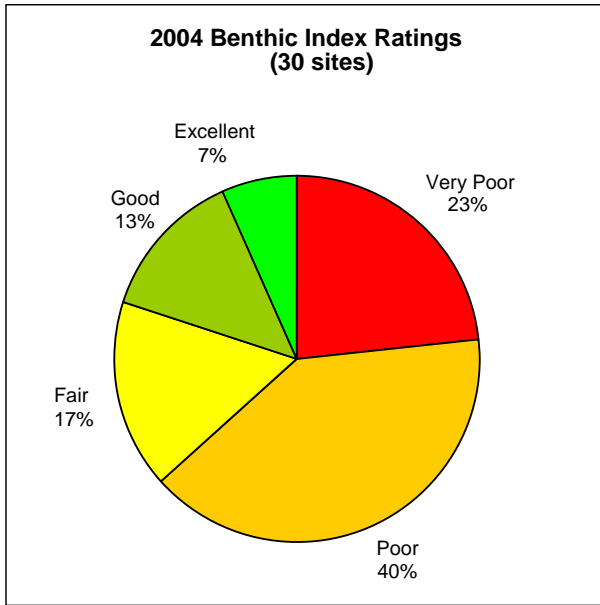


Figure E1. Ratings of 2004 biomonitoring sites based on benthic macroinvertebrate data.

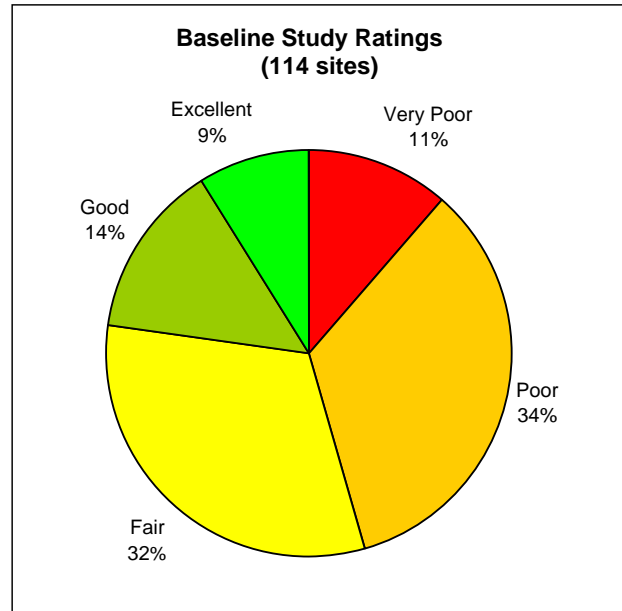


Figure E2. Ratings of benthic macroinvertebrate data from the baseline study. Data was collected in 1999 and the baseline report was published in 2001.

## Results

**Biological Monitoring:** The results of the 2004 benthic macroinvertebrate monitoring are similar to the results of the baseline study (Figures E1 and E2). The 2004 data suggest that more than 60 percent of the county's streams are in "poor" to "very poor" condition and 80 percent are now "fair" to "very poor" based on a five category rating scale (Figures E1). The five category scale is: excellent; good; fair; poor; and very poor. Forty-five percent were in "poor" to "very poor" condition based on the baseline study (Figures E2). The benthic macroinvertebrate community lacks enough sensitive species that are indicators of good water quality and is dominated by tolerant species that are characteristic of degraded streams. According to fish index all sites received a rating of less than "good" (Figure E3). The fish community is dominated by habitat generalists, omnivores, and non-native species.

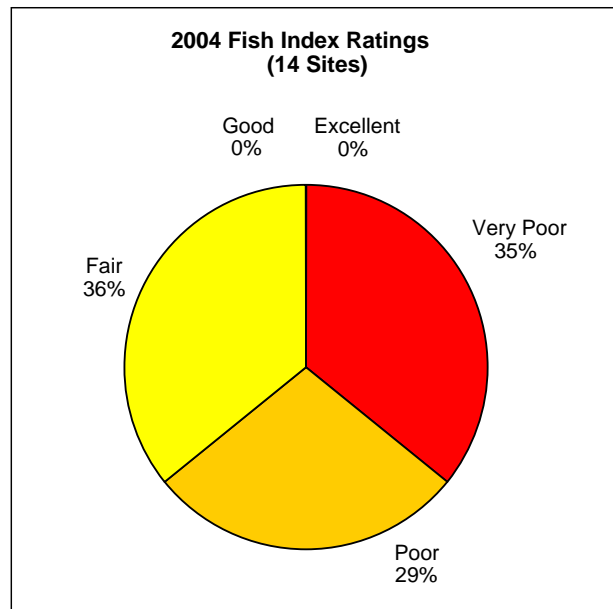


Figure E3. Ratings of 2004 biomonitoring based on fish data.

Volunteer monitoring programs such as those conducted by the Northern Virginia Soil and Water Conservation District and the Audubon Naturalist Society also show similar signs of poor water quality. For example, 81 percent of Northern Virginia Soil and Water Conservation District sites reported “unacceptable” conditions.

**Bacteria Monitoring:** All sites sampled in 2004 for bacteria violated the state’s water quality standard for fecal coliform bacteria (400 f.c./100 ml) on at least one occasion. Of the 67 sites that were sampled four times (seasonally) during 2004, 20 percent of the sites exceeded the water quality standard for bacteria levels on all sampling occasions (Figure E4).

Based on historical bacteria monitoring data, the Fairfax County Health Department issued the following statement related to the use of streams for contact recreation:

*“In summary, any open, unprotected body of water is subject to pollution from indiscriminate dumping of litter and waste products, sewer line breaks and contamination from runoff pesticides, herbicides, and waste from domestic and wildlife animals. Therefore, the use of streams for contact recreational purposes, such as swimming, wading, etc., which could cause ingestion of stream water or possible contamination of an open wound by stream water, should be avoided.”*

Additional information related to use of streams for contact recreation is available on the Health Department’s web site at:

<http://www.fairfaxcounty.gov/service/hd/resourcewater.htm>

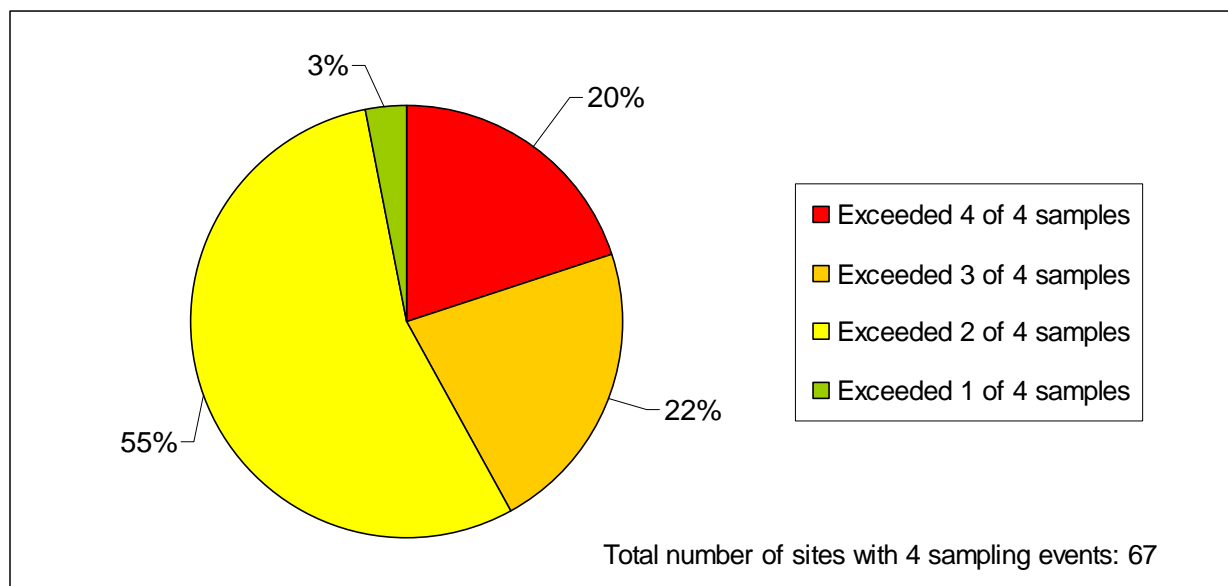


Figure E4. Percentage of sites with exceedences of the state’s water quality standard (400 f.c./100ml) for fecal coliform bacteria.

Countywide Stream Quality Index: A stream quality index was developed to establish a performance measure for a key natural resource (streams) which are visible and of great interest to the public. The index which is based on benthic macroinvertebrate data suggests a small decline in overall stream quality from data collected in 2004 compared to data collected for the baseline study (from 2.76 to 2.41, over a possible range or scale of 1 to 5). However, it is difficult to make any broad statements about trends based on data from two sampling years. This index will be reported annually to evaluate trends in the overall health of streams countywide.